

Installation manual

Envalve

Series VK, VKF and PVK



Version 2.1
20th of October 2011



VAN DER ENDE
POMPEN

Preface

This installation manual is a manual for the installer or technician who is installing the Envalve. It is not a manual for the (end) user of the Envalve.

If not entirely installed and connected, the Envalve has no real function and is therefore classified as a machine which cannot function independently (or “unfinished machine”, later on this is called just “machine”).

This installation manual contains only prescriptions concerning the safe installation, correct connecting and safe working with the Envalve. It is not a manual for the entire installation in which the Envalve is installed. The installer should take care of that manual.

Every chapter has a number and chapters are divided into paragraphs where needed . The list of contents on page 2 gives an overview of the chapters and paragraphs with a reference to the page numbers.

When a number or letter is between brackets this refers to the numbers or letters of parts in picture 1.

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1. Identification

In this chapter some general information about the machine is listed. The purpose of this chapter is to state the boundaries of the machine, the global functioning and possible applications of the machine.

1.1 General information

1.1.1 Description of the machine

The Envalve is available in different versions; the VK with max. NW63, the VKF from NW75 up to NW200 and the PVK from NW20 up to NW200. All Envalve's are electrical or pneumatic powered butterfly valves.

An Envalve consists of five main parts:

1. Motor plate; metal base plate (d) single or double version.
2. Butterfly valve; 1 or 2 butterfly valves with EPDM or FPM seal (f, g and possible h).
 - a. Later on, this is referred to as 'valve' or 'actual valve'.
3. Drive; electromotor or pneumatic actuator (a).
4. Connector; between the motor and the butterfly valve and in case of a double Envalve version also between both butterfly valves (e and n).
5. Connection between the piping and the valve(s) (i and j) by means of a collar or nut.

The purpose and function of the Envalve is the regulation or stopping of a flow of fluid media through a pipe. The Envalve can be operated remotely.

The valve has an outgoing axle with which the valve can be rotated. By means of fixing a remote operated drive on this axle, the valve can be operated remotely.

In case of the double Envalve version (two interconnected valves with one drive), the valve with the drive on top is in the position indicated with the indicator (b) while the other valve is exactly 90 degrees rotated from this position. This is default, other configurations are possible.

The Envalve's function is the regulation of a flow of fluid media through a pipe or in case of the double Envalve version the mixing of two flows of fluid media with a certain proportion to each other.

It is prohibited to use the Envalve otherwise than fully connected and installed in a suitable piping system with a maximum working pressure of 6 bar. The difference between the pressure before and after the Envalve must be below 6 bar.

The Envalve is therefore classified as an unfinished machine.

1.1.2. Specifications

Type	VK
Power	3.5 W
Voltage	24 of 230 Vac
Capacity	10 - 100 m ³ / hour/valve
Pressure max.	6 bar
NW	20 - 63
Drive	Electromotor Centra Honeywell VMM or VMK

Table 1. Specifications VK series.

Type	VKF
Power	9 - 26 W
Voltage	24 of 230 Vac
Capacity	280 - 2000 m ³ / hour/ valve
Pressure max.	6 bar
NW	75 - 200
Drive	Electromotor Hora M135, M150 or M180

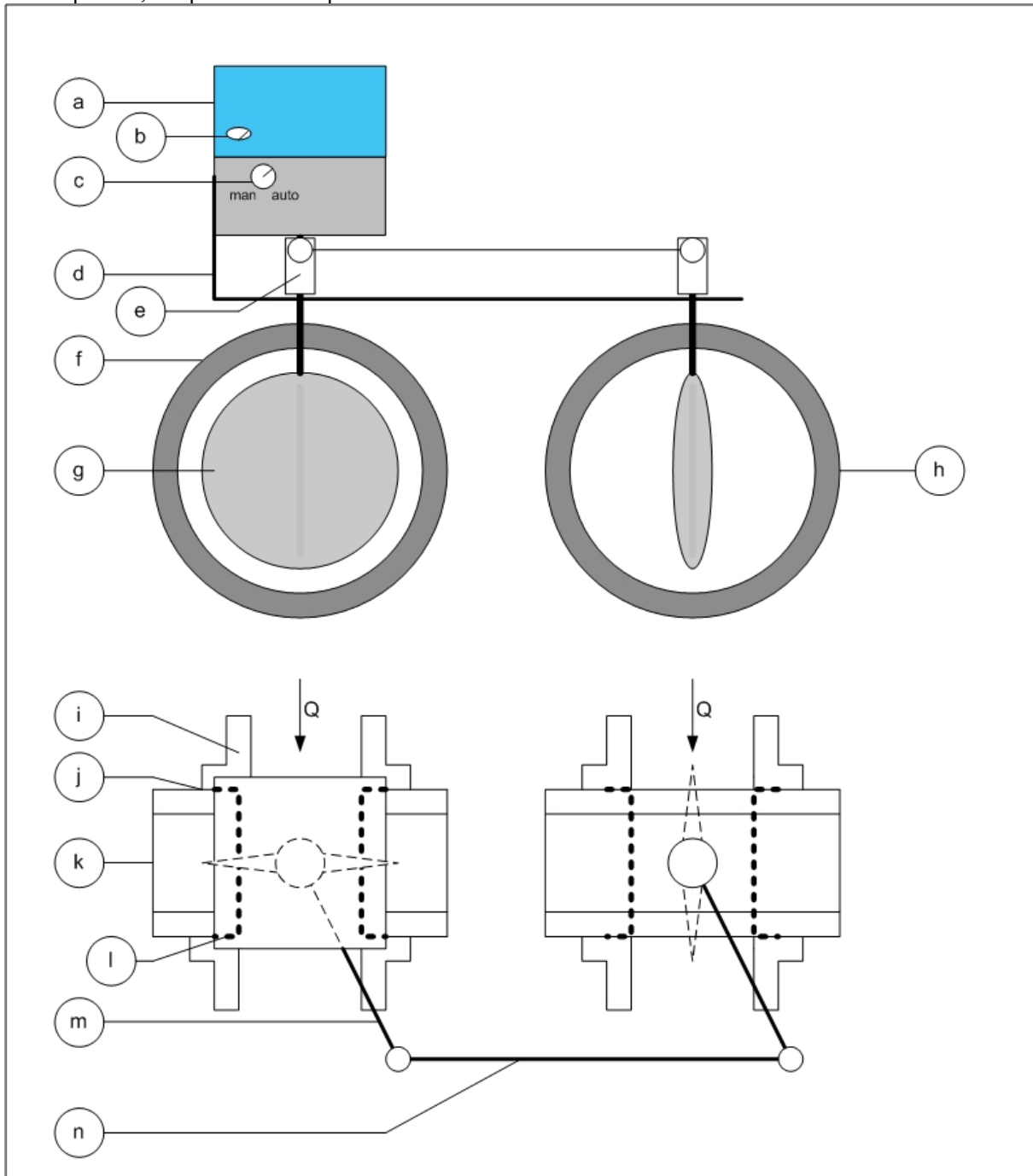
Table 2. Specifications VKF series.

Type	PVK
Power	5 - 9 W
Voltage	24 Vdc / Vac or 230 Vac
Capacity	56 - 2000 m ³ / hour/valve
Pressure max.	6 bar
NW	20 - 63 and 75 - 200 (different connection to piping, see paragraph 2.2)
Drive	Pneumatic actuator OMAL series DA Dual drive in combination with electrical monostable valve type 5/2
Operating pressure	6 bar

Table 3. Specifications PVK series.

1.2 Schematic picture of the machine

In this picture, the parts and components are numbered.



Picture 1. Schematic picture of an Envalve.

Note; the Envalve in the picture is a VKF, although other versions are not entirely the same, the main components and the functions of the components is the same.

	Name
a	Drive
b	Position indicator
c	"manual - auto" control button
d	Base plate
e	Coupling
f	Housing
g	Paddle
h	Secondary butterfly valve
i	Collar
j	Flange
k	Primary butterfly valve (direct driven)
l	Seal
m	Connector shaft
n	Coupling rod

Table 4. Names of the main components.

1.3 Operation and manual control

It is possible to operate the Envalve remotely, but it is also possible to operate the Envalve manually, that is to say, it is possible to manually open or close ('turn') the Envalve. The procedure for this differences between the different versions;

Important: when the valve is switched from manual to automatic operation, the valve should be half open (exactly between open and closed)!

Make sure the automatic operating of the Envalve is disabled before any manual operating is tried!

- VK: press the black knob on the upper side of the drive, as long as this knob is pressed, the Envalve can be controlled manually using the connector shaft (m).
- VKF: turn the red knob on the side (c) to the "man" (manual) position, the Envalve can now be controlled manually using the connector shaft (m). To reset the valve to automatic (remote) operation, turn the red knob (c) to the "auto" position, then push against the connector shaft (m) until a 'click' is heard.
- PVK: there are two options for the PVK. The first and most desirable option is to use a flat screwdriver to turn the control screw (nr. 6 in picture 8) a quarter, this is only possible if the pneumatics are connected. The other option is to use a spanner to turn the axle on the upper side of the actuator (drive), this is only possible if the pneumatics are disconnected (no air pressure on the control valve). For this last option, also the pneumatic pressure lines between the control valve and the actuator should be disconnected. Make sure the air pressure is not re-connected when these lines are disconnected.

The position indicator (b) indicates the position of the paddle.

Every Envalve is equipped with two limit switches, these switches stop the valve when it's in the most open or most closed position. There is a possibility to use these switches or to incorporate a potentiometer in order to be able to (electrically) 'read' the position of the valve. The limit switches are sealed for warranty purposes.

For the remote operation paragraph 4.2 and the annexes can be consulted, in which an electric scheme of the Envalve can be found. Further connection (to a control panel or something alike) is not included in this installation manual.

1.4 Users

In general, there are no direct 'users' of the Envalve, because it is operated remotely by a control panel or other (semi)automatic controller. Allowed users are at least 18 years and employed at the company at which the Envalve is installed, and who are designated to be competent and able to operate the Envalve.

Not allowed users are users who don't comply with above description. Not allowed users are all users who cause danger and/or unsafe situations for themselves and/or others while using the Envalve.

1.5 Application

The Envalve is meant for the regulation or stopping of a flow of fluid media through a pipe or (in case of the double version) the mixing of two flows with a certain proportion to each other. It is forbidden to use the Envalve while it is not fully installed and connected in accordance with the installation prescriptions in a suitable piping system.

It is forbidden to use the Envalve for purposes other than that as described above, or for purposes where failing of the Envalve can cause serious danger for persons.

1.6 Media

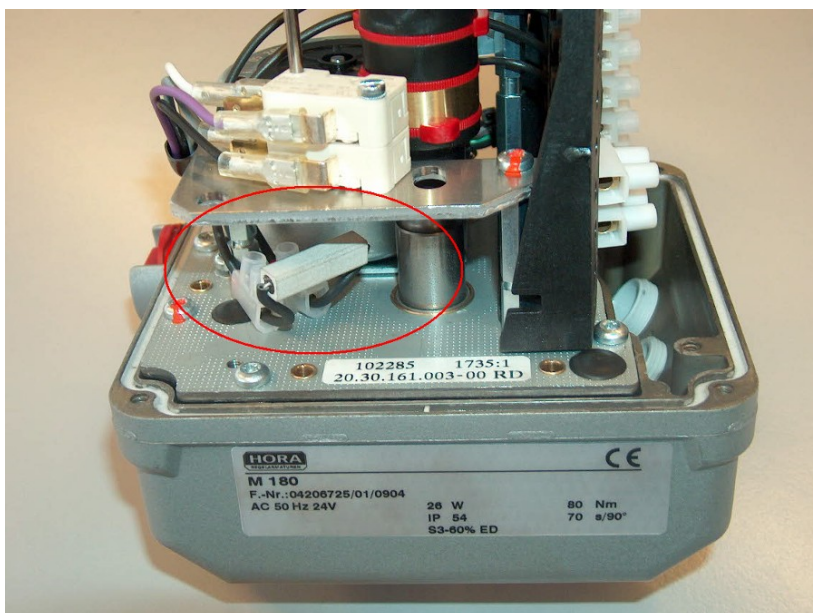
The Envalve is not chemically resistant for all chemicals, ask the producer of the Envalve for advise. If the Envalve is used for wrong chemicals, leaking will occur and warranty will expire.

It is possible to alter the seals in the Envalve in order to make it (more) resistant for other chemicals, ask the producer of the Envalve for advice.

1.7 Use environment

The Envalve is meant for use as a controlled stop or regulator of a flow of fluid media. The Envalve may only be used if it is fully installed and connected in accordance with the installation prescriptions.

For use in a moist and/or cold environment, the Envalve can be equipped with a small heating element for protection (see picture below). Ask the producer for advice!



Picture 2. Heating element (optional).

The Envalve and particularly the drive may not be submerged.

Install the Envalve only if there is enough free space around it, a person must be able to operate the button “man – auto” (c) safely. It must be impossible for a person to get stuck between the base plate and connector shaft or other objects.

The Envalve can be installed in virtually every position, except up side down (drive under the valve), see also paragraph 4.1.

The Envalve can not be used in an explosive environment.

1.8 Warranty

The warranty is 6 months from commissioning, with a maximum term of 2 years after production. Commissioning is the installation of an Envalve in an installation. Parts must be brought to the producer when warranty is claimed.

Warranty expires with one or more of the following terms:

- unprofessional use and/or installation;
- repeatedly ignoring advice from producer and/or supplier;
- reparation, maintenance or use by incompetent or unauthorised persons;
- use of incorrect electrical or fluid connections;
- use of the machine in an unsuited environment;
- intended damaging or modification of the machine.

All these and further warranty terms are in conformation with the METAALUNIEVOORWAARDEN (edition January 2008).

1.9 CE sign

The CE sign concerns the conformity of the Envalve with the machine, low voltage, EMC and PED directive. Because it is an unfinished machine, the Envalve cannot comply with all the essential safety precautions, a list of these can be supplied by the producer.

The CE sign is located on the sticker on the base plate.

According to the low voltage directive, the Envalve is classified as a Class I machine.

1.10 Rest risks

For practical and economic reasons it is impossible to fully cover all the risks for 100%, besides, the risk of a machine is tightly correlated with the functionality of the installation as a whole. These so called rest risks are listed in the table below. It is important that the user is aware that, even while we have taken all possible safety precautions, the use of the Envalve involves certain risks. Follow the prescriptions in this manual in order to minimize these risks.

Risk-Nr.	Rest risk description	Risk-factor ¹	Category
1.	Moving part approaches static object. When the connector shaft moves to left or to right it approaches the base plate.	3	A1.1
2.	When the Envalve is used while it is not fully installed and connected, there is a danger of fingers getting stuck.	3	A1.1
3.	Risk on fire, if the electrics are not professionally connected, a risk on short circuit and fire arises.	4	A1.3

Table 5. List of rest risks.

¹ The aim is to reduce every risk to a level below 4, but this isn't always possible due to the functionality of the machine.

2. Description

In this chapter the machine is described, it is the background information needed to work safely with the machine.

2.1 Working principle

The Envalve regulates the flow by means of turning a paddle in a housing. By turning the paddle, the effective diameter of the pipe changes.

2.2 In general

The Envalve must be installed in a suitable piping system, only after installation is completely finished the electric and/or pneumatic connections can be made.

With an Envalve, a flow of fluid media can be precisely controlled or stopped. Application examples are the (continuous) mixing of two flows of fluid (VK an VKF series, double version) and the remote shutting of pipes (all series).

The remote operation of the Envalve is possible because the drive is powered by electrics or pneumatics. Normally there are two limit switches installed, but more position switches or a potentiometer can be installed to 'read' (or read more precisely) the position of the Envalve. The position indicator (b) indicates the position of the paddle. In case of a double version of the Envalve, the position indicator indicates the position of the paddle of the valve directly under the drive.

The 'turning time' of the valve (the time in which the valve goes from fully closed to fully open) varies per series: the VK and VKF take about 70 seconds (10 seconds is also available, ask the producer for information), for the PVK this time depends on operating pressure and the pneumatic connections. Optional is a flow regulator on the PVK, with this the turning time can be tuned.

The VKF and VK series are bistable, which means that when the power supply is cut off, the valve stays in that position. The PVK series is monostable, the valve returns to its default position when the power supply is interrupted (only if there is sufficient air pressure). Other configurations are available.

The connection between the Envalve and the piping for NW63 and smaller consists of a collar and a pvc nut. At NW 75 and larger this connection consists of a collar, two flanges and some nuts and bolts.

For NW63 and smaller the Envalve has a seal made of EPDM (default) or FPM (optional) between the paddle and the housing. And 2 O-ring seals between the valve and the collars.

From NW75 and larger the Envalve has only one seal, which sits between the housing and paddle and between the valve and the collars.

2.3 Transport and storage

Transport and storage do not require special packaging but can not be stacked without special crates or other precautions. The Envalve and the drive in particular is only moderately resistant to water and moist, so the Envalve must be protected against both (see also paragraph 1.7).

3. Safety instructions

Read and understand this installation manual and take all the prescribed precautions before installing or connecting the Envalve!

The Envalve may only be used for the applications the Envalve was designed for.

The Envalve was designed to function as a stop or regulator in a system or process working with flows of fluid media. These media may only contain those chemicals suitable for the Envalve and its components which come into contact with them. Further information about application and use can be found in paragraph 1.5 and 1.7.

It is forbidden to use the Envalve in a system with solid substances or gasses.

Only connect the Envalve to pressurised air and/or electricity if its fully installed in a suitable system. Before the Envalve can be taken out of the system, the pressurised air and/or electricity must be disconnected.

Maximum pressure for the Envalve is 6 bar.

Always disconnect the pressurised air and/or electricity before maintenance or reparation. Disconnect the electricity by using the main switch from the controlling organ (control panel or something alike), this switch must be locked during the work on the Envalve.

Always fully connect the pressurised air and electricity after the maintenance or repairs and test the Envalve.

Work on the Envalve or the connection of the electrics or pneumatics must be done by a competent and professional person.

230 V Connections must be 4 core cables (open, close, ground and earth) of sufficient diameter and quality, conform regulations.

Always connect the ground cable to the terminal marked with the ground sign.

Make sure the power cable is connected to a group fused at maximum 16 A with a ground fault circuit interrupter of 30 mA.

4. Installation

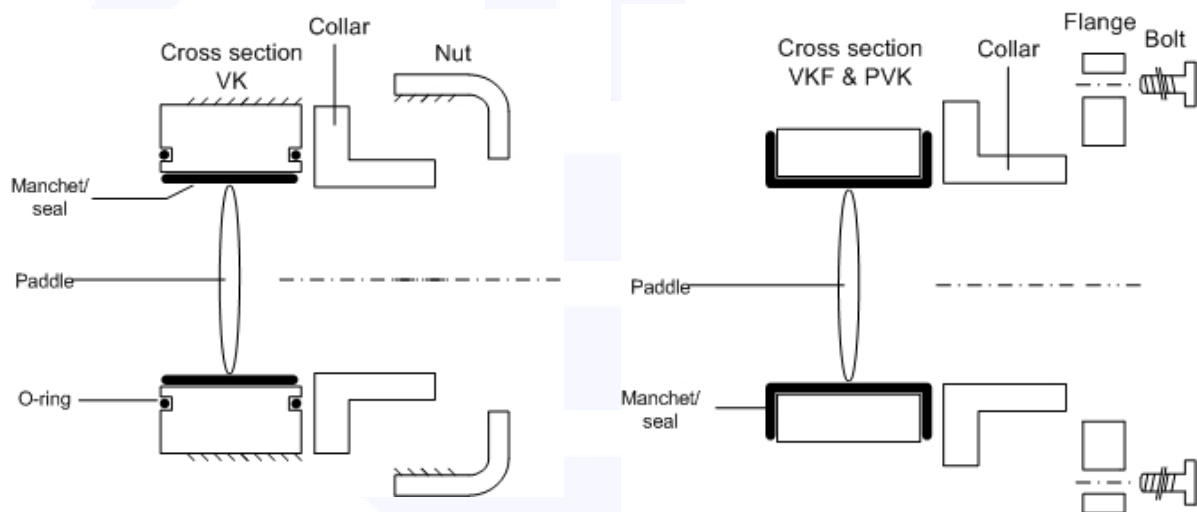
4.1 Mechanical

For the correct installation of the Envalve, first fit all the piping without glue. When everything is correct in size and properly aligned, loosen the bolts or the nut and take the actual valve from between the collars. Be careful not to damage the seal while doing this. Put the valve aside and remove the collars from the piping.

Glue the collars to the piping. Excess glue on the inside of the piping should be removed, this glue can get between the seal and the paddle and cause serious damage or leaking.

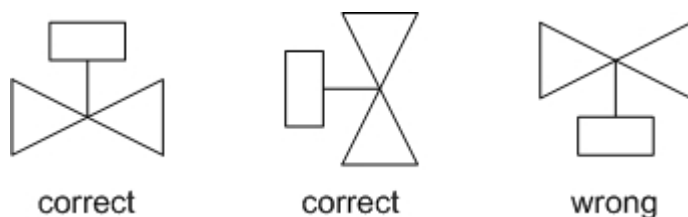
Make sure you put the flanges or the nut over the piping behind the collars before the collars are glued, the flanges or nut cannot be added later!

From NW75 and larger there is only one seal, serving as seal between the paddle and housing and as seal between the collars and actual valve. NW63 and smaller have two separate O-rings as seal between collar and valve and another seal between the housing and the paddle. It is important that for all the Envalve's plain smooth collars are used, not the ones with a groove (for an O-ring), otherwise they will leak. The use of additional seals is unnecessary and we strongly advise not to.



Picture 4. Seal Envalve NW63 and smaller (left) and NW75 and larger (right).

When the collars are glued and excess glue is removed, the actual valve can be put back between the collars, again, be careful not to damage the seal. The valve can be installed in every position, except up side down (drive under valve).



Picture 5. Installation positions Envalve.

When the valve is positioned correctly between the collars the flanges can be shoved over the collars and secured with the metal bolts and nuts (NW75 and larger) or the nut can be tightened (NW63 and smaller).

After installation the connection must be checked; try to operate the valves manually by closing and opening them by hand. This must be able without scraping noise and with only moderate force. See paragraph 1.3 for instructions on manual operating.

Do not tighten the bolts and nuts too much, this will deform the seal and possibly block the paddle!



4.2 Electric

The valves must be electrically connected by professional and competent persons, look at the pictures in the annexes for help.

VKseries

- Remove the three screws from the lid of the drive;
- remove the lid of the drive;
- put the power cable through the cable gland;
- connect the earth cable to the terminal marked with the earth sign (only the 230 V version);
- connect the ground cable to terminal 1;
- connect the two phases to terminal 2 and 3;
- tighten the cable gland;
- check the functioning of the Envalve;
- switch the two phases if the drive turns the wrong way round;
- close the lid of the drive and secure with the three screws.

VKF series

- Remove the four screws from the lid of the drive;
- remove the lid of the drive;
- put the power cable through the cable gland;
- connect the earth cable to the terminal marked with the earth sign (only the 230 V version);
- connect the ground cable to terminal N1;
- connect the two phases to terminal 2 and 3;
- tighten the cable gland;
- check the functioning of the Envalve
- switch the two phases if the drive turns the wrong way round;
- close the lid of the drive and secure with the four screws.

PVKseries

- Remove the screw on top of the cap of the (electric) control valve (the black part);
- remove the cap of the coil of the control valve;
- put the power cable through the cable gland;
- connect the earth cable to the terminal marked with the earth sign (only the 230 V version);
- connect the wires to terminal 1 and 2;
- tighten the cable gland;
- place the seal between the coil and the cap;
- put the cap back on the coil and tighten the screw;
- check the functioning of the Envalve.

4.3 Pneumatic

PVK series

- See picture 8 in the annexes;
- connect the air supply to connection 3;
- make sure the connection is correct.

5. Commissioning

Check whether the valve is installed correctly and the flanges or nut are secured. Check before filling the system with fluid again the functioning (manual and automatic).

When the Envalve is set from manual to automatic (remote) operation, push against the connector shaft until a 'click' is heard.

It is important that the valve is in the neutral position (in the middle between open and closed) before going from manual to automatic operation and/or before commissioning. This prevents the valve turning beyond its limit switches and getting damaged. See also paragraph 1.3.

6. Maintenance

The Envalve is designed as maintenance free, when used in a suitable environment for intended applications. Periodic inspection and cleaning are not essential but desirable.

Clean the Envalve with a dry cloth, do not use water on the electrical part. Do not use aggressive cleaning chemicals.

7. Errors

Problem	Cause	Solution
1. Valve does not turn	Control button 'man – auto' is set to manual No power supply present. Blown fuse Faulty connected drive Short circuit due to moist Burned drive	Put the valve in the neutral position! Set the control button to 'auto' and push against the connector shaft until a 'click' is heard. Find the problem and fix the power supply. Find the cause and replace the fuse. Check the connections (schematic is in the annexes). Find the cause, try to dry the drive, replace the seal of the drive when needed and consider a heating element (see paragraph 1.7). Find the cause and replace the drive(motor), check the supply voltage and functioning of the valves (especially check for obstructions of the paddle).
2. Drive turns instable/restless (constant opening and closing)	Incorrect connected capacitor or loose contact To much voltage drop due to long cables or insufficient diameter Fluctuating power supply Drive is told to open and close at the same time	Contact the producer. Check the supply voltage (at the drive), calculate voltage drop, replace power cable when needed. Check the supply voltage. Change the control program.
3. Drive fails regularly	Loose contact in power supply Bad or defect limit switches	First, make sure the power is switched off! Check and tighten all contacts. Replace limit switches
4. Drive doesn't turn (entirely) to the end position	Incorrect set limit switches Defect sprocket in drive Drive capacitor defect Too much system pressure or to much pressure difference over the valve Obstruction of the paddle	Let the producer reset the limit switches, do not attempt to do this yourself, warranty will expire! Replace the drive (this is often an error due to obstruction of the paddle). Contact the producer. Check and reset the system pressure. Disassemble the valve (loosen the flanges/nut and remove valve from system) and remove obstruction.

Table 6. Errors and solutions.

8. Declaration of conformity

EG-DECLARATION OF CONFORMITY

(according to Annex II B of the Machinery Directive 2006/42/EG, for machinery which cannot function independently or machinery parts)

We, Van der Ende Pompen B.V.
Maasambacht 4
2676 CW Maasdijk
Nederland

Herewith declare, on our own responsibility, that the product:

Envalve
Series VK, VKF and PVK

Which this declaration refers to, to be incorporated into machinery or assembled with other machinery to constitute machinery covered by the Machinery Directive, is (where appropriate) in conformity with the following standard(s) or other specifications:

Machinery Directive	2006/42/EG
Low Voltage Directive	2006/95/EG
EMC Directive	2004/108/EG
PED Directive	97/23/EG

The product this declaration refers to must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the relevant European Directives.

Nederland
Maasdijk
5 November 2009

P.J. van der Ende



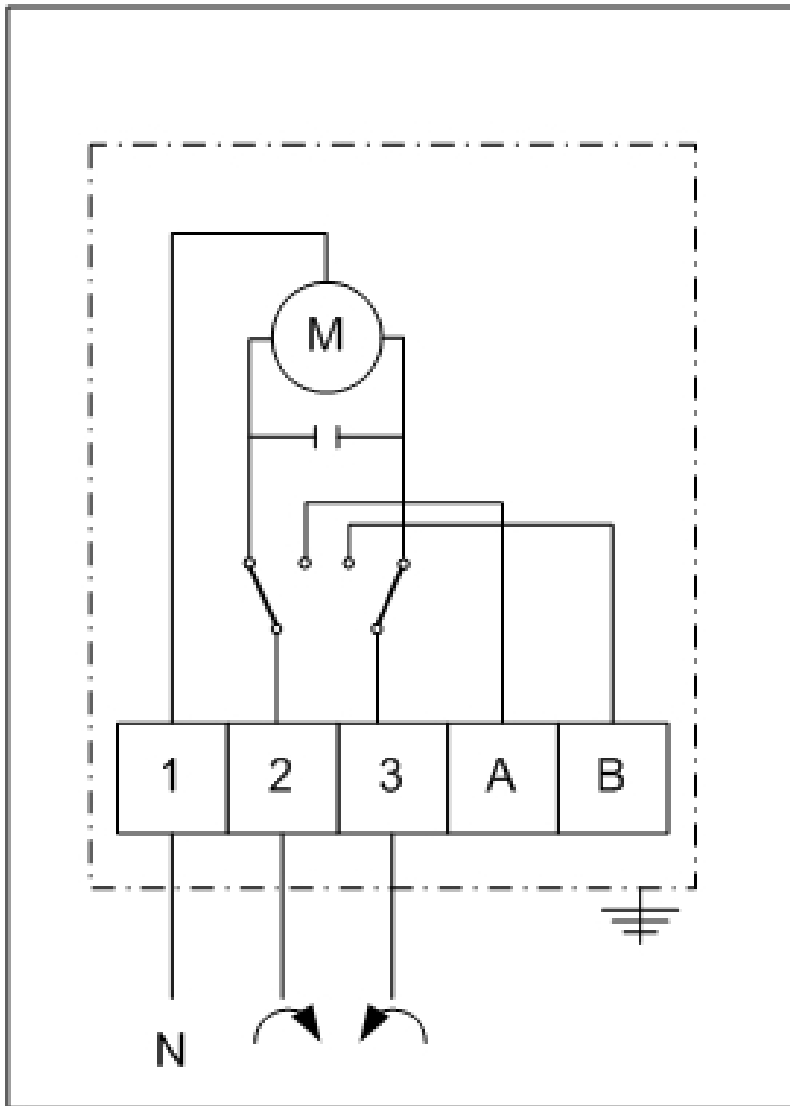
Annexes

- **Electric schematics**
- **Declaration of conformity of components**



Electric schematics

VK series

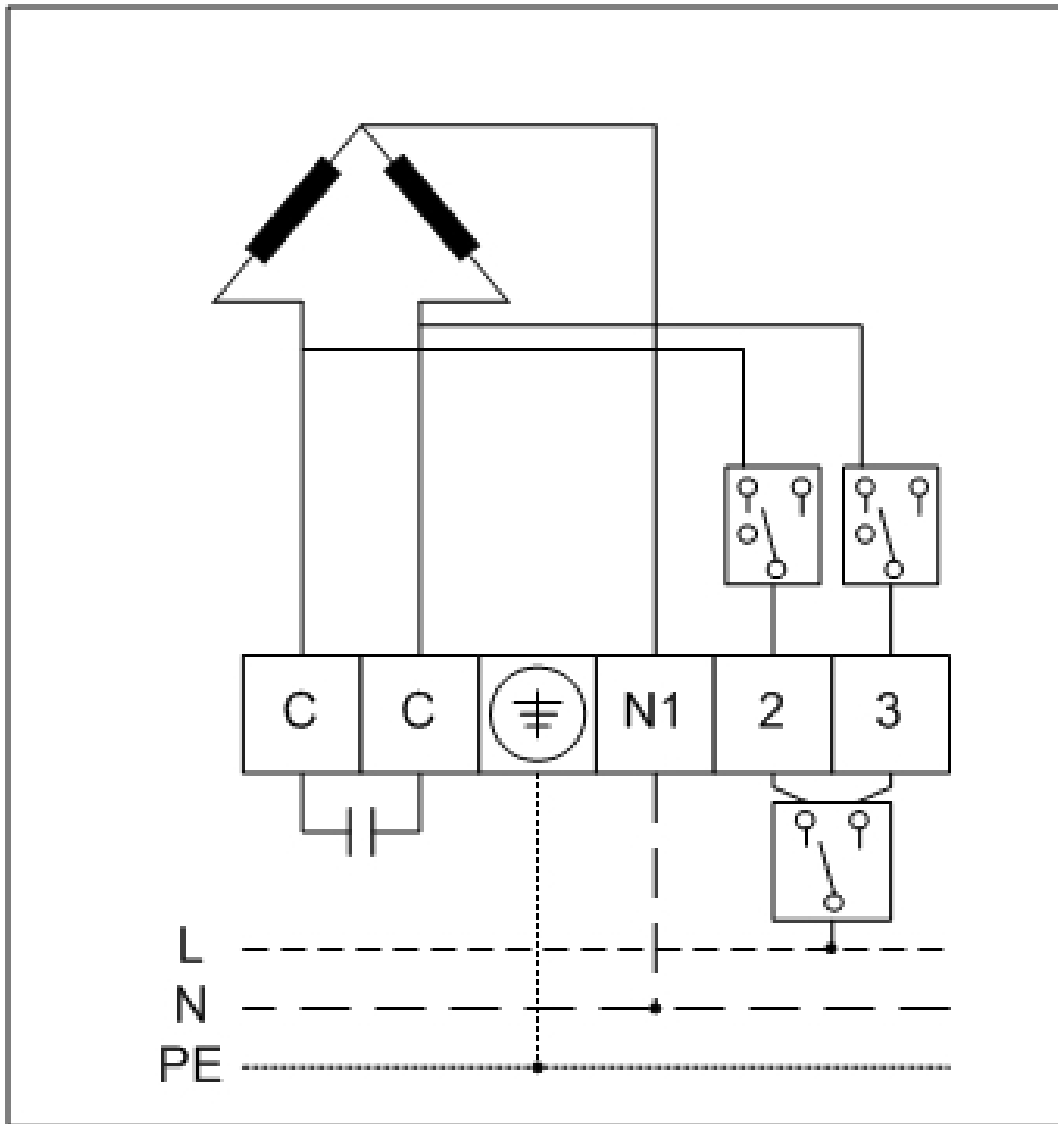


Picture 6, electric scheme VK series.

Terminal 1 is the ground cable, when terminal 1 and 2 are connected to a power source, the valve will turn clockwise, when terminal 1 and 3 are connected to a power source, the valve will anticlockwise.

The earth cable must be connected to the terminal on the housing, marked with the earth sign.

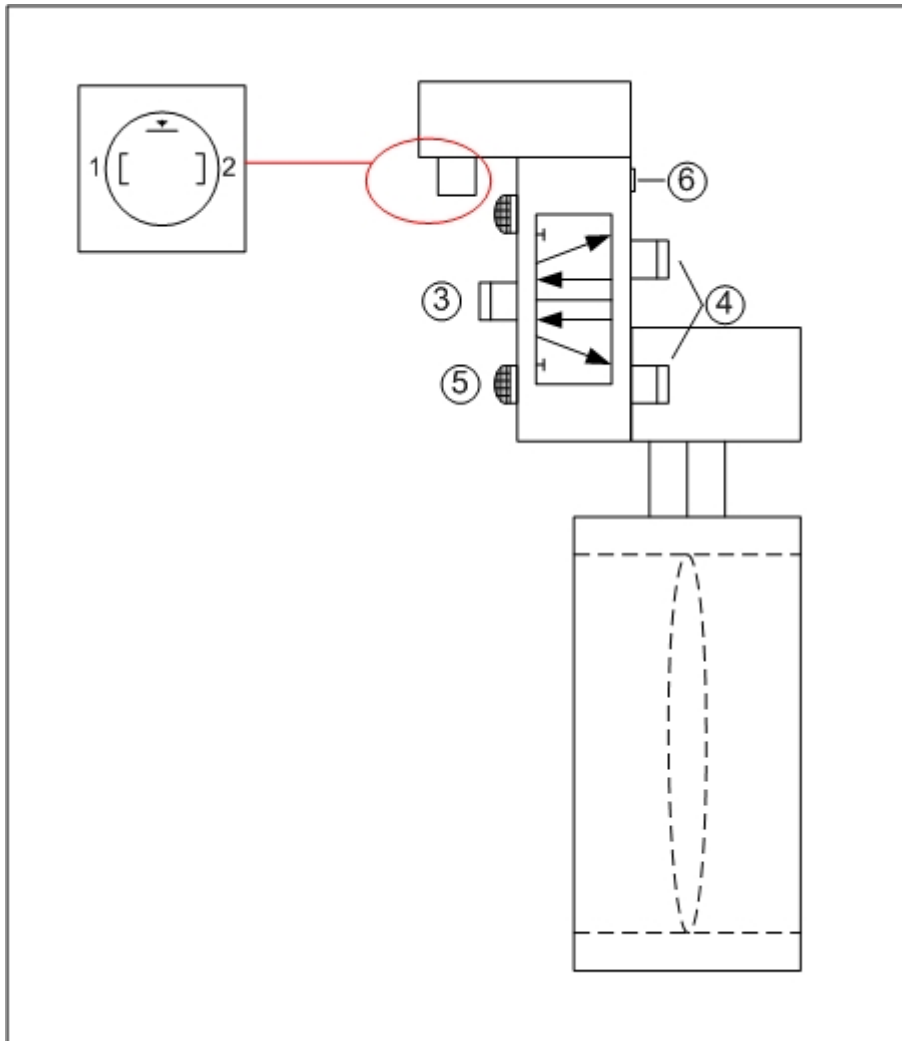
VKF series



Picture 7, electric scheme VKF series.

Terminal N1 is the ground cable, the control current runs through terminal 2 and/or 3. The earth cable must be connected to the terminal marked with the earth sign.

PVK series



Picture 8, electric scheme control valve PVK

The flat plug (marked with a small earth sign) is the earth connection, by running a current from connection 1 to 2 (a steering current), the control valve will open and the Envalve will open. The control valve is monostable, so the control valve will close automatically (and the Envalve will return to its default position) when the steering current is removed.

Connect the pressurised air supply to connection 3, connections 4 are the supply-lines for the actuator and 5 are the silencers. The Envalve is sold with connections 4 connected (ready for use). The turning time can be adjusted by placing a flow regulator on connections 5. Contact the producer for help and advice.

The needed air pressure for a correct functioning of the actuator differences between the various types and sizes. Usually, this is minimum 6 bar and maximum 8 bar.

Number 6 in this picture is the control screw for manual operation of the control valve. The control valve will open by turning the control screw a quarter, see also paragraph 1.3.

Declaration of conformity of components

Honeywell

CE

**KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY
DECLARATION DE CONFORMITE**

Name / Name / Nom:
Anschrift / Address / Adresse:

Honeywell GmbH
Böblinger Str. 17
71101 Schönaich
Germany

Wir erklären in alleiniger Verantwortung, dass
We declare on our own responsibility that
Nous déclarons sous notre propre responsabilité que

das Produkt / the Product / le Produit:

Rotary Valve Actuator

VMK8-4
VMK10-4
VMK10-4-24

VMM20
VMM30
VMM40

VMM20-24
VMM30-24
VMM40-24

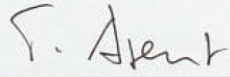
VMM40F
VMM40-24F

allen Anforderungen der Richtlinien 2006/95/EG + 2004/108/EG entspricht.
meets all requirements of the directive 2006/95/EC + 2004/108/EC.
remplit toutes les exigences de la directive 2006/95/CE + 2004/108/CE.

Angewandte Normen:
Applied standards:
Normes appliquées:

EN 60730-1/A15:2007
EN 60730-2-14/A1:2001

Schönaich, 12. März 2008



Dr. Thomas Arenz
General Manager

CE014.0004251.00012



EU Declaration of conformity

Confirm with the

- **Directive 98/37/EC, Appendix II A:** of the European Parliament and of the Council of 22 June 1998 on the approximation of the laws of the Member States relating to machinery
- **Council Directive 2004/108/EC:** of 20 January 2005 on the approximation of the laws of the Member States relating to electromagnetic compatibility
- **Council Directive 2006/95/EC:** of 16 January 2007 on the harmonization of the laws of the Member States relating to electrical equipment designed for use within certain voltage limits „low voltage“

The appliance

Product: electric quarter-turn actuator, type of construction Holter Regelarmaturen

Type: M106, M125, M135, M140, M150, M180 (230 V)

has been developed, designed and manufactured in accordance with the mentioned European Directives, and sole responsibility of

Company: Holter Regelarmaturen GmbH & Co. KG

Application of the following standards:

- DIN EN 292/1 and DIN EN 292/2 Safety of machinery
- DIN EN 60204-1 Safety of machinery – Electrical equipment of machines
- DIN EN 61000-4-2, -3, -4, -5, -6, -11 Electromagnetic compatibility (EMC) – Testing and measurement techniques; Immunity tests
- DIN EN 55011 Industrial, scientific and medical (ISM) radio-frequency equipment – Radio disturbance characteristics – Limits and methods of measurement
- DIN EN 55022 Information technology equipment – Radio disturbance characteristics - Limit and methods of measurement
- DIN EN 50082-1, -2 Electromagnetic compatibility (EMC) – Generic standards; Immunity for residential, commercial and light-industrial environments and for industrial environments

A **Technical Documentation** is completely available.

The operating instructions for the appliance are available:

- in original version (German language)
- in English language

Schloß Holte-Stukenbrock, 10.12.2008

Place, Date

Signature

Holter Regelarmaturen GmbH & Co. KG

Specifics concerning the signatory